Benchmark Cost Proxy Model
Release 3.1

Switch Model Inputs

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Developed by
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Preface

The purpose of this document is to discuss the definition, value, source and rationale for the individual inputs for BCPM 3.1. This edition includes information on the Switching module inputs. Descriptions of inputs associated with the other modules contained in BCPM 3.1 are provided in their respective Model Inputs documents.

A more general discussion of the inputs for the other modules of BCPM 3.1 can be found in the BCPM 3.1 Model Methodology.

SWITCH MODEL INPUTS
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BCPM Switch Model Inputs

1 State Default Table

This table contains inputs that can reasonably be made specific to the state and company level. The input values supplied with BCPM 3.1 represent what the sponsors consider to be reasonable representative values for these inputs. The defaults are provided for the convenience of users who may not have access to more specific data. Some are based upon observations and the judgement of BCPM subject matter experts. The BCPM Sponsors do not represent the provided values as necessarily appropriate for every potential serving area. Many of the inputs have a wide range of valid values. We recommend that the user replace these values with state and company specific inputs whenever available. Several of these inputs are state defaults to be used when CLLI-specific data has not been provided via the Switch-Specific Data Table.

1.1 State

1.1.1 Definition

The state to which the inputs pertain.

1.1.2 Typical Input Value

Not Applicable.

1.1.3 Source

Postal abbreviations for states and territories.

1.1.4 Rationale

Allows data to be provided on a state-specific basis.

1.2 ARMIS Percent Local Calls

1.2.1 Definition

Percent of calls that are local (intra-switch and inter-switch). Includes Extended Area Service (EAS) calling.

1.2.2 Typical Input Value

ARMIS Percent Local Calls
81.5%

1.2.3 Source

Derived from ARMIS Report 43-08, Number of Local Calls / Total Calls. The values supplied with BCPM are state-specific.

1.2.4 Rationale

The percent local calls is used along with a number of local calls per line to develop an engineered number of calls per line for use in switch investment estimation. This typical value represents the average of all states.

1.3 ARMIS Percent Toll Calls

1.3.1 Definition

Percent of calls that are IntraLATA and InterLATA toll.

1.3.2 Typical Input Value

ARMIS Percent Toll Calls
18.5%

1.3.3 Source

Derived from ARMIS Report 43-08, (Number of IntraLATA toll calls plus InterLATA toll calls) / Total Calls. The values supplied with BCPM are state-specific.

1.3.4 Rationale

The percent toll calls is used along with a number of toll calls per line to develop an engineered number of calls per line for use in switch investment estimation. This typical value represents the average of all states.

1.4 ARMIS Percent Residence Lines

1.4.1 Definition

This is the percentage of switched local exchange lines that are residential.

1.4.2 Typical Input Value

Percent Residence Lines
67.4%

1.4.3 Source

Derived from ARMIS 43-08 results. The values supplied with BCPM are state-specific.

1.4.4 Rationale

This input is used to develop the engineered busy hour calls and CCS per line when the user opts to develop those parameters from direct input of calls and minutes. It is also used to develop customer calling characteristics that are used to determine the percent of usage investment that is attributable to USF. This typical value represents the average of all states.

1.5 Percent Business Lines

1.5.1 Definition

This is the percentage of switched local exchange lines that are business (single- and multi-line).

1.5.2 Typical Input Value

Percent Business Lines
32.6%

1.5.3 Source

Derived from ARMIS 43-08 results. The values supplied with BCPM are state-specific.

1.5.4 Rationale

This input is used to develop the engineered busy hour calls and CCS per line when the user opts to develop those parameters from direct input of calls and minutes. It is also used to develop customer calling characteristics that are used to determine the percent of usage investment that is attributable to USF. This typical value represents the average of all states.

1.6 Default Engineered Calls per Line

1.6.1 Definition

This is the number of Busy Hour calls per line used to engineer switches. This input is used to estimate total switch investments if the user opts not to develop this value by inputting assumptions about the number of calls and minutes per line. If the user has provided CLLI-specific inputs via the User Data table, then those will be used instead of this default.

1.6.2 Default Input Value

Default Engineered Calls per Line
2.5

1.6.3 Source

This input should be obtained from switch engineering experts for the company under study, if possible. The default input value represents the judgement and experience of BCPM sponsor company subject matter experts.

1.6.4 Rationale

This input was chosen to be consistent with the engineering data used to price switches and as input to Audited LEC Switch Models (ALSMs). A round number was selected to protect the confidentiality of the actual data. Typically, switches are engineered to a single traffic input such as this, rather than discrete estimates of residential and business usage.

1.7 Default Engineered CCS per Line

1.7.1 Definition

This is the number of Busy Hour CCS per line used to engineer switches. This input is used to estimate total switch investments if the user opts not to develop this value by inputting assumptions about the number of calls and minutes per line. If the user has provided CLLI-specific inputs via the User Data table, then those will be used instead of this default.

1.7.2 Default Input Value

Default Engineered CCS per Line
3.6

1.7.3 Source

This input should be obtained from switch engineering experts for the company under study, if possible. This input represents the judgement and experience of BCPM sponsor company subject matter experts.

1.7.4 Rationale

This input was chosen to be consistent with the engineering data used to price switches and as input to Audited LEC Switch Models (ALSMs). A round number was selected to protect the confidentiality of the actual data. Typically, switches are engineered to a single traffic input such as this, rather than discrete estimates of residential and business usage.

1.8 Number of Busy Hour Local/EAS Calls per Residence Line (Optional)

1.8.1 Definition

This is the number of Busy Hour residence calls per line (Local and Extended Area Service) to be designated as Universal Service usage. There are two user-defined options under which this input is used:

- Engineering Option set to "C": This input is used to estimate the total switch invesment.
- USF Option set to "C": This input is used to determine the portion of total usage investment attributable to Universal Service.

1.8.2 Suggested Input Value

Number of Busy Hour Local/EAS Calls per Residence Line
2.0

1.8.3 Source

We recommend that the user request wire-center specific studies to obtain this data if possible. Telco engineering departments may have switch engineering data that could be used. The value supplied here was chosen to be consistent with the engineering data supplied for input 1.6.

1.8.4 Rationale

The BCPM Sponsors believe that engineering data provides the most reliable source for this input.

1.9 Number of Busy Hour Local/EAS Calls per Business Line (Optional)

1.9.1 Definition

This is the number of Busy Hour business calls per line (Local and Extended Area Service) to be designated as Universal Service usage. There are two user-defined options under which this input is used:

- Engineering Option set to "C": This input is used to estimate the total switch invesment.
- USF Option set to "C": This input is used to determine the portion of total usage investment attributable to Universal Service.

1.9.2 Suggested Input Value

Number of Busy Hour Local/EAS Calls per Business Line
2.0

1.9.3 Source

We recommend that the user request wire-center specific studies to obtain this data if possible. Telco engineering departments may have switch engineering data that could be used. The value supplied here was chosen to be consistent with the engineering data supplied for input 1.6.

1.9.4 Rationale

The BCPM Sponsors believe that engineering data provides the most reliable source for this input.

1.10 Number of Busy Hour Toll Calls per Residence Line (Optional)

1.10.1 Definition

This is the number of Busy Hour residence calls per line (IntraLATA Toll and InterLATA Toll). There are two user-defined options under which this input is used:

- Engineering Option set to "C": This input is used to estimate the total switch invesment.
- USF Option set to "C": This input is used to determine the portion of total usage investment attributable to Universal Service.

1.10.2 Suggested Input Value

Number of Busy Hour Toll Calls per Residence Line
0.5

1.10.3 Source

We recommend that the user request wire-center specific studies to obtain this data if possible. Telco engineering departments may have switch engineering data that could be used. The value supplied here was chosen to be consistent with the engineering data supplied for input 1.6.

1.10.4 Rationale

The BCPM Sponsors believe that engineering data provides the most reliable source for this input.

1.11 Number of Busy Hour Toll Calls per Business Line (Optional)

1.11.1 Definition

This is the number of Busy Hour business calls per line (IntraLATA Toll and InterLATA Toll). There are two user-defined options under which this input is used:

- Engineering Option set to "C": This input is used to estimate the total switch invesment.
- USF Option set to "C": This input is used to determine the portion of total usage investment attributable to Universal Service.

1.11.2 Suggested Input Value

Number of Busy Hour Toll Calls per Business Line
0.5

1.11.3 Source

We recommend that the user request wire-center specific studies to obtain this data if possible. Telco engineering departments may have switch engineering data that could be used. The value supplied here was chosen to be consistent with the engineering data supplied for input 1.6.

1.11.4 Rationale

The BCPM Sponsors believe that engineering data provides the most reliable source for this input.

1.12 Number of Local/EAS Minutes per Call per Residence Line (Optional)

1.12.1 Definition

This is the number of Minutes per residence call (Local and Extended Area Service). There are two user-defined options under which this input is used:

- Engineering Option set to "C": This input is used to estimate the total switch invesment.
- USF Option set to "C": This input is used to determine the portion of total usage investment attributable to Universal Service.

1.12.2 Suggested Input Value

Number of Local/EAS Minutes per Call per Residence Line
2.5

1.12.3 Source

We recommend that the user request wire-center specific studies to obtain this data if possible. Telco engineering departments may have switch engineering data that could be used. The value supplied here was chosen to be consistent with the engineering data supplied for input 1.7.

1.12.4 Rationale

The BCPM Sponsors believe that engineering data provides the most reliable source for this input.

1.13 Number of Local/EAS Minutes per Call per Business Line (Optional)

1.13.1 Definition

This is the number of Busy Hour Minutes per business call (Local and Extended Area Service). There are two user-defined options under which this input is used:

- Engineering Option set to "C": This input is used to estimate the total switch invesment.
- USF Option set to "C": This input is used to determine the portion of total usage investment attributable to Universal Service.

1.13.2 Suggested Input Value

Number of Local/EAS Minutes per Call per Business Line
2.5

1.13.3 Source

We recommend that the user request wire-center specific studies to obtain this data if possible. Telco engineering departments may have switch engineering data that could be used. The value supplied here was chosen to be consistent with the engineering data supplied for input 1.7.

1.13.4 Rationale

The BCPM Sponsors believe that engineering data provides the most reliable source for this input.--

1.14 Number of Toll Minutes per Call per Residence Line (Optional)

1.14.1 Definition

This is the number of Busy Hour Minutes per residence call (InterLATA Toll and IntraLATA Toll). There are two user-defined options under which this input is used:

- Engineering Option set to "C": This input is used to estimate the total switch invesment.
- USF Option set to "C": This input is used to determine the portion of total usage investment attributable to Universal Service.

1.14.2 Suggested Input Value

Number of Toll Minutes per Call per Residence Line
2.5

1.14.3 Source

We recommend that the user request wire-center specific studies to obtain this data if possible. Telco engineering departments may have switch engineering data that could be used. The value supplied here was chosen to be consistent with the engineering data supplied for input 1.7.

1.14.4 Rationale

The BCPM Sponsors believe that engineering data provides the most reliable source for this input.

1.15 Number of Toll Minutes per Call per Business Line (Optional)

1.15.1 Definition

This is the number of Busy Hour Minutes per business call (InterLATA Toll and IntraLATA Toll). There are two user-defined options under which this input is used:

- Engineering Option set to "C": This input is used to estimate the total switch invesment.
- USF Option set to "C": This input is used to determine the portion of total usage investment attributable to Universal Service.

1.15.2 Suggested Input Value

Number of Toll Minutes per Call per Business Line
2.5

1.15.3 Source

We recommend that the user request wire-center specific studies to obtain this data if possible. Telco engineering departments may have switch engineering data that could be used. The value supplied here was chosen to be consistent with the engineering data supplied for input 1.7.

1.15.4 Rationale

The BCPM Sponsors believe that engineering data provides the most reliable source for this input.

1.16 Land Loading

1.16.1 Definition

The ratio of land investment to central office investment.

1.16.2 Default Input Value

Land Loading
0.0117

1.16.3 Source

The land ratio is based upon the 1995 ARMIS values of Land divided by the sum of COE (Switching, Operator and Transmission).

1.16.4 Rationale

Application of this ratio produces an investment in land needed to place the central office. The investment function is:

$$\textit{Land investment} = \textit{Land Loading} * \textit{Switch Investment}$$

1.17 Building Loading

1.17.1 Definition

The ratio of building investment to central office investment.

1.17.2 Default Input Value

Building Loading
0.0738

1.17.3 Source

The Building factor was based upon a LEC Industry data request (the actual data value was a land and building factor, the ARMIS land factor was subtracted to arrive at the building factor).

1.17.4 Rationale

Application of this ratio produces an investment in land needed to place the central office. The investment function is:

*Building investment = Building Loading * Switch Investment*

1.18 Telco E&I Factor

1.18.1 Definition

The ratio of telephone company capitalized engineering and installation dollars to switch investment dollars.

1.18.2 Default Input Value

Telco E&I Factor
0.0577

1.18.2 Source

The default input is taken from BCPM 1.1. We strongly recommend that users develop inputs specific to the local company under study. Data for this calculation should be available from the accounting records of the company.

1.18.3 Rationale

The Telco E&I factor is needed to calculate the investment for telephone company capitalized engineering expenses. The investment function is:

*Telco E&I Investment = Telco E&I Loading * Vendor EF&I Switch Investment*

1.19 Common Equipment & Power Factor

1.19.1 Definition

The ratio of central office common equipment and powerplant investment to switch dollars.

1.19.2 Default Input Value

Common Equipment & Power Factor
0.0682

1.19.2 Source

The default input is taken from BCPM 1.1. We strongly recommend that users develop inputs specific to the local company under study. Data for this calculation should be available from the accounting records of the company.

1.19.3 Rationale

The CE&P factor is needed to calculate the investment for telephone company capitalized engineering expenses. The investment function is:

*CE&P Investment = CE&P Loading * EF&I Switch Investment*

1.20 Percent of Local Calls that are Interoffice

1.20.1 Definition

The percent of total Local/EAS calls (that are outgoing to another central office). This input is used to determine the percentage of trunk usage that is attributable to Universal Service.

1.20.2 Default Input Value

Percent of Local Calls that are Interoffice
60%

1.20.3 Source

This is an INDETEC estimate based on consultation with BellSouth, Sprint, and U S WEST subject matter experts.

1.20.4 Rationale

The default input is believed to be a good approximation of a typical value at the national level. This value can, however vary widely by locale. We strongly recommend the use of a locally developed input if possible.

1.21 Average Busy Season Busy Hour CCS per Trunk

1.21.1 Definition

The engineered objective capacity of each trunk.

1.21.2 Default Input Value

ABSBH CCS per Trunk
28.8

1.21.3 Source

This value is based on a suggested default from the Bellcore SCIS model. It represents an 80% utilization of the trunk. 28.8 CCS is 80% of 36 CCS, the maximum usage.

1.21.4 Rationale

This input is consistent with switch-specific engineering inputs used in the development of the Switch Regression Model.

1.22 Feature Calls/Total Calls

The fraction of total busy hour calls that invokes usage of a vertical service or feature. This input is used to develop a number of busy hour feature calls for future use in developing UNE investments. This input is not used for universal service.

1.23 Portion of SS7 Usage Attributable to Basic Calling

1.23.1 Definition

The switch model includes an investment for the Service Switching Point (SSP), and element of the SS7 network that resides in the end office switch. This input allows the user to assign a portion of the SSP to Universal Service.

1.23.2 Default Input Value

Portion of SS7 Usage Attributable to Basic Calling
25%

1.23.3 Source

This is an INDETEC estimate based on the judgement of BCPM sponsor subject matter experts.

1.23.4 Rationale

The portion of the SSP investment that is attributable to Universal Service is the portion associated with basic call setup. Other types of calls are considered vertical services and features and are not part of the definition of Universal Service.

1.24 Line to Trunk Ratio

1.24.1 Definition

The average number of working lines per local interoffice trunk terminated on the switch. This input is used to determine the number of trunks on each switch. Because the actual number of trunks can vary widely for switches of a given size, we highly recommend that the user provide this input to the Switch-Specific input table on a CLLI basis.

1.24.2 Default Input Value

Line to Trunk Ratio
14

1.24.3 Source

The recommended source is an actual engineered trunk count for each switch. If this is not available, then the default can be used. The default value was calculated from the engineering data used to develop the Switch Regression Model.

1.24.4 Rationale

The Regression Model data contained actual trunk counts for every host and standalone switch.

1.25 Switch Percent Line Fill

1.25.1 Definition

The Percent Fill represents the ratio between the number of working lines on the switch (as publicly reported) and the total number of lines for which the switch is engineered.

The difference is due to administrative spares and allowances for growth over an engineering time horizon of several years. The percent fill is used to adjust the number of reported working lines for purposes of calculating total switch investments.

1.25.2 Default Input Value

Switch Percent Line Fill
88%

1.25.3 Source

The best source for this data would be the telephone company switch engineering subject matter experts or the switch vendor.

1.25.4 Rationale

The input value used was derived from the actual engineering inputs used to run the ALSMs in the development of the Switch Regression Model.

1.26 Lucent 5ESS Market Share

1.26.1 Definition

The percentage of switch lines on a forward-looking basis that will be 5ESS. This input is used in the switch investment estimation process.

1.26.2 Default Input Value

Lucent 5ESS Market Share
50%

1.26.3 Source

The best source for this data would be the engineering and purchasing departments of the companies under study.

1.26.4 Rationale

The Lucent 5ESS and the Nortel DMS-100 are the predominant central office switches in the United States today. Interviews with BellSouth, Sprint, and U S WEST subject matter experts indicate that in most cases, future switch placements will be one of these two types. Since the operating companies and switch vendors consider this data highly confidential, BCPM is supplied with an even distribution between the switch types.

1.27 Nortel DMS-100 Market Share

1.27.1 Definition

The percentage of switch lines on a forward-looking basis that will be Nortel. This input is used in the switch investment estimation process.

1.27.2 Default Input Value

Nortel DMS Market Share
50%

1.27.3 Source

The best source for this data would be the engineering and purchasing departments of the companies under study.

1.27.4 Rationale

The Lucent 5ESS and the Nortel DMS-100 are the predominant central office switches in the United States today. Interviews with BellSouth, Sprint, and U S WEST subject matter experts indicate that in most cases, future switch placements will be one of these two types. Since the operating companies and switch vendors consider this data highly confidential, BCPM is supplied with an even distribution between the switch types.

1.28 Call Completion Fraction

1.28.1 Definition

The percentage of call attempts that result in completed calls.

1.28.2 Default Input Value

Call Completion Fraction
0.7

1.28.3 Source

The best source for this data would be the telephone company switch engineering subject matter or the switch vendor. The default value was adopted from the Hatfield Model 4.0 inputs portfolio.

1.28.4 Rationale

This input is used to adjust the number of engineered busy hour calls (which represent call completions) upward to account for calls attempted but not completed. The resulting number of busy hour call attempts is used to check whether the switch has exceeded the constraint upon busy hour call attempts.

1.29 Reserve CCS Inv. Per Line: 5ESS Host/Standalone (Optional)

1.29.1 Definition

This input is provided for users who opt to include the Reserve CCS capacity switching investment in the Line Port investment category. A dollar amount per line (undiscounted) is required.

1.29.2 Default Input Value

Reserve CCS Inv. Per Line – 5ESS Host/Standalone
$0.00

1.29.3 Source

This data may be obtained from the Bellcore Switching Cost Information System (SCIS) or other switching model.

1.29.4 Rationale

Many local exchange companies and their regulating entities have agreed that the Reserve CCS investment is a function of line ports, while the BCPM switch regression model includes this investment as a part of usage. SCIS provides both options. The two applications can be considered equally appropriate, depending on the individual company's engineering practices and policy at the state level. BCPM offers this option so as not to exclude any valid economic policies.

1.30 Reserve CCS Inv. Per Line: 5ESS Remote (Optional)

1.30.1 Definition

This input is provided for users who opt to include the Reserve CCS capacity switching investment in the Line Port investment category. A dollar amount per line (undiscounted) is required.

1.30.2 Default Input Value

Reserve CCS Inv. Per Line – 5ESS Remote
$0.00

1.30.3 Source

This data may be obtained from the Bellcore Switching Cost Information System (SCIS) or other switching model.

1.30.4 Rationale

Many local exchange companies and their regulating entities have agreed that the Reserve CCS investment is a function of line ports, while the BCPM switch regression model includes this investment as a part of usage. SCIS provides both options. The two applications can be considered equally appropriate, depending on the individual company's engineering practices and policy at the state level. BCPM offers this option so as not to exclude any valid economic policies.

1.31 Reserve CCS Inv. Per Line: DMS Host/Standalone (Optional)

1.31.1 Definition

This input is provided for users who opt to include the Reserve CCS capacity switching investment in the Line Port investment category. A dollar amount per line (undiscounted) is required.

1.31.2 Default Input Value

Reserve CCS Inv. Per Line – DMS Host/Standalone
$0.00

1.31.3 Source

This data may be obtained from the Bellcore Switching Cost Information System (SCIS) or other switching model.

1.31.4 Rationale

Many local exchange companies and their regulating entities have agreed that the Reserve CCS investment is a function of line ports, while the BCPM switch regression model includes this investment as a part of usage. SCIS provides both options. The two applications can be considered equally appropriate, depending on the individual company's engineering practices and policy at the state level. BCPM offers this option so as not to exclude any valid economic policies.

1.32 Reserve CCS Inv. Per Line: DMS Remote (Optional)

1.32.1 Definition

This input is provided for users who opt to include the Reserve CCS capacity switching investment in the Line Port investment category. A dollar amount per line (undiscounted) is required.

1.32.2 Default Input Value

Reserve CCS Inv. Per Line – DMS Remote
$0.00

1.32.3 Source

This data may be obtained from the Bellcore Switching Cost Information System (SCIS) or other switching model.

1.32.4 Rationale

Many local exchange companies and their regulating entities have agreed that the Reserve CCS investment is a function of line ports, while the BCPM switch regression model includes this investment as a part of usage. SCIS provides both options. The two applications can be considered equally appropriate, depending on the individual company's engineering practices and policy at the state level. BCPM offers this option so as not to exclude any valid economic policies.

1.33 Small Switch Vendor Share

1.33.1 Definition

BCPM 3.1 allows the input of switch investment equations for up to three small central office switches. These equations are used when the central office size falls below a user-defined threshold. This input is used to produce a weighted average investment from the three alternative small switch equations.

1.33.2 Default Input Value

Vendor 1 Share	Vendor 2 Share	Vendor 3 Share
100%	0%	0%

1.33.3 Source

The best source for this data would be the engineering and purchasing departments of the companies under study.

1.33.4 Rationale

BCPM 3.1 is supplied with a single small switch estimation model.

2 Switch-Specific Data Table

The data in this table is not required to run the Model. It is highly recommended, however, that this table be populated to ensure the most accurate results possible for each wire center. The user may input switch-specific data for certain inputs where that data is available. The data may be provided for a subset of the CLLIs in the study, if desired. BCPM will use the switch-specific data from this table when available, or use defaults from the State Default Table otherwise.

2.1 CLLI

2.1.1 Definition

Common Language Location Identifier. This is the 11-digit CLLI of the switch entity, as defined by the LERG.

2.1.2 Typical Input Value: "ALBSALMADS0"

2.1.3 Source

Extracts from LERG.

2.2 Switch Type

2.2.1 Definition

The vendor model of the central office switch. Presently, BCPM supports 5ESS and DMS-100 host, remotes, and standalone offices.

2.2.2 Typical Input Values: "5EH", "5ER", "DMSH", "DMSR".

The Main Logic module keys on the first character of this field, so the "D" and the "5" are the critical values.

2.2.3 Source

Can be obtained from local engineering records or from ALSM data.

2.3 Busy Hour Calls per Line

2.3.1 Definition

Number of Average Busy Season Busy Hour calls per line. Include all types of calls (local and toll).

2.3.2 Typical Input Value: 2.5

2.3.3 Source

Should be obtained from local engineering records or ALSM input files.

2.3.4 Rationale

This input is used with the Switch Regression Model to compute the total investment per switch. The format of the input is compatible with ALSM inputs.

2.4 Busy Hour CCS per Line

2.4.1 Definition

Total number of Average Busy Season Busy Hour CCS per line. Include all types of usage (local and toll).

2.4.2 Typical Input Value: 3.6

2.4.3 Source

Should be obtained from local engineering records or ALSM input files.

2.4.4 Rationale

This input is used with the Switch Regression Model to compute the total investment per switch. The format of the input is compatible with ALSM inputs.

2.5 Lines per Trunk

2.5.1 Definition

As described in 1.23 above.

2.5.2 Typical Input Value: 14

2.5.3 Source

Obtained from local engineering records or ALSM databases.

2.6 Percent Fill

2.6.1 Definition

The Percent Fill represents the ratio between the number of working lines on the switch (as publicly reported) and the total number of lines that the switch is engineered for. The difference is due to administrative spares and allowances for growth over an engineering time horizon of several years. The percent fill is used to adjust the number of reported working lines for purposes of calculating total switch investments.

2.6.2 Typical Input Value: 88%

2.6.3 Source

We recommend using engineering records for each individual switch. The inputs to the ALSMs include this value for each switch.

3 Global Inputs

3.1 SS7 SSP Investment: 5ESS

3.1.1.1 Definition

This is the non-discounted vendor engineered, furnished and installed (EF&I) investment for the SS7 Service Switching Point (SSP) equipment located in each host or standalone central office.

3.1.1.2 Default Input Value

SS7 SSP Investment – 5ESS
$300,000

3.1.1.3 Source

Local purchasing / procurement department or an Audited LEC Switching Model (ALSM), such as SCIS or SCM.

3.1.1.4 Rationale

The default input value falls within a range of SCIS and SCM results produced by the BCPM sponsor companies.

3.2 SS7 SSP Investment: DMS

3.3.1.1 Definition

This is the non-discounted vendor engineered, furnished and installed (EF&I) investment for the SS7 Service Switching Point (SSP) equipment located in each host or standalone central office.

3.3.1.2 Default Input Value

SS7 SSP Investment – DMS-100
$150,000

3.1.1.3 Source
Local purchasing / procurement department or an Audited LEC Switching Model (ALSM), such as SCIS or SCM.

3.1.1.4 Rationale
The default input value falls within a range of SCIS and SCM results produced by the BCPM sponsor companies.

3.3 Switch Discounts: 5ESS

3.3.1 New Switch Discount

3.3.1.1 Definition
Discount from list price for new 5ESS switches.

3.3.1.2 Default Input Value

New Switch Discount – 5ESS
50%

3.3.1.3 Source
Local purchasing / procurement department. This data is considered confidential and is protected by purchasing contracts.

3.3.2 Growth Discount Rate

3.3.2.1 Definition
Discount from list price for 5ESS growth lines.

3.3.2.2 Default Input Value

Growth Discount Rate – 5ESS
50%

3.3.2.3 Source
Local purchasing / procurement department. This data is considered confidential and is protected by purchasing contracts.

3.3.3 Percent of Lines New

3.3.3.1 Definition
Percent of new lines for 5ESS switches.

3.3.3.2 Default Input Value

Percent of Lines New – 5ESS
50%

3.3.3.3 Source
Local purchasing / procurement department. This data is considered confidential and is protected by purchasing contracts.

3.3.4 MDF & Protector Discount Rate

3.3.4.1 Definition
MDF & Protector discount for 5ESS switches.

3.3.4.2 Default Input Value

MDF & Protector Discount – 5ESS
50%

3.3.4.3 Source
Local purchasing / procurement department. This data is considered confidential and is protected by purchasing contracts.

3.4 Switch Discounts: DMS

3.4.1 New Switch Discount

3.4.1.1 Definition
Discount from list price for new DMS switches.

3.4.1.2 Default Input Value

New Switch Discount – DMS
50%

3.4.1.3 Source
Local purchasing / procurement department. This data is considered confidential and is protected by purchasing contracts.

3.4.2 Growth Discount Rate

3.4.2.1 Definition
Discount from list price for DMS growth lines.

3.4.2.2 Default Input Value

Growth Discount Rate – DMS
50%

3.4.2.3 Source
Local purchasing / procurement department. This data is considered confidential and is protected by purchasing contracts.

3.4.3 Percent of Lines New

3.4.3.1 Definition
Percent of new lines for DMS switches.

3.4.3.2 Default Input Value

Percent of Lines New – DMS
50%

3.4.3.3 Source
Local purchasing / procurement department. This data is considered confidential and is protected by purchasing contracts.

3.4.4 MDF & Protector Discount Rate

3.4.4.1 Definition
MDF & Protector discount for DMS switches.

3.4.4.2 Default Input Value

MDF & Protector Discount – DMS
50%

3.4.4.3 Source
Local purchasing / procurement department. This data is considered confidential and is protected by purchasing contracts.

3.5 Portion of Line Protector and MDF Attributable to USF

3.5.1 Definition

This input is used to apportion the non-traffic sensitive line protector frame and MDF investments between USF and other services.

3.5.2 Default Input Value

Portion of Line Protector and MDF Attributable to USF
100%

3.5.3 Source

Assumption.

3.5.4 Rationale

The FCC concluded in its Further Notice of Proposed Rulemaking that all of the port costs are costs of Universal Service.

3.6 Portion of Line Port Attributable to USF

3.6.1 Definition

This input is used to apportion the non-traffic sensitive line port investments between USF and other services.

3.6.2 Default Input Value

Portion of Line Port Attributable to USF
100%

3.6.3 Source

Assumption

3.6.4 Rationale

The FCC concluded in its Further Notice of Proposed Rulemaking that all of the port costs are costs of Universal Service.

3.7 "Heavy Business" Feature Loading Multiplier

3.7.1 Definition

The additional processor load caused by feature usage at a business line penetration ratio of 100%.

3.7.2 Default Input Value

"Heavy Business" Feature Loading Multiplier
2.00

3.7.3 Source

This input was adopted from the Hatfield Model 4.0 Inputs Portfolio. Use of this figure facilitates comparison of results from different models.

3.7.4 Rationale

Business lines are assumed to create heavier call processing loads upon the switch because of feature usage. This input is used to adjust the busy hour call attempts upward to account for feature usage. It is also used in determining the percent of processor utilization due to features, for purposes of allocating the correct percentage of processor usage to universal service.

3.8 Minimum Feature Loading Multiplier

3.8.1 Definition

The floor or lowest value allowed for the feature loading multiplier. This is the multiplier level at the percent business penetration specified in input 3.9.

3.8.2 Default Input Value

Minimum Feature Loading Multiplier
1.20

3.8.3 Source

This input was adopted from the Hatfield Model 4.0 Inputs Portfolio. Use of this figure facilitates comparison of results from different models.

3.8.4 Rationale

Every switch, no matter how few business lines, is assumed to have a minimum feature load due to residential and business subscribers.

3.9 Business Penetration Ratio

3.9.1 Definition

The penetration ratio at which the minimum feature loading multiplier is reached.

3.9.2 Default Input Value

Business Penetration Ratio
0.3

3.9.3 Source

This input was adopted from the Hatfield Model 4.0 Inputs Portfolio. Use of this figure will facilitate the comparison of model outputs. Use of this figure facilitates comparison of results from different models.

3.9.4 Rationale

3.10 Maximum Lines per Switch

3.10.1 Definition

This is the capacity constraint representing the number of lines at which the Model splits the wire center into multiple switches.

3.10.2 Default Input Value

Maximum Lines per Switch
80,000

3.10.3 Source

This input was adopted from the Hatfield Model 4.0 Inputs Portfolio. Use of this figure facilitates comparison of results from different models.

3.10.4 Rationale

3.11 Maximum Busy Hour Call Attempts per Switch

3.11.1 Definition

This is the capacity constraint representing the number of busy hour call attempts at which the Model splits the wire center into multiple switches.

3.11.2 Default Input Value

Maximum Busy Hour Calls per Switch
600,000

3.11.3 Source

This input was adopted from the Hatfield Model 4.0 Inputs Portfolio. Use of this figure facilitates comparison of results from different models.

3.11.4 Rationale

3.12 Maximum Busy Hour CCS per Switch

3.12.1 Definition

This is the capacity constraint representing the number of busy hour call CCS at which the Model splits the wire center into multiple switches.

3.12.2 Default Input Value

Maximum Busy Hour CCS per Switch
1,800,000

3.12.3 Source

This input was adopted from the Hatfield Model 4.0 Inputs Portfolio. Use of this figure facilitates comparison of results from different models.

3.12.4 Rationale

3.13 Discount Adjustment Factors

3.13.1 Definition

The Discount adjustment factors adjust the input switch vendor discounts to create effective vendor discounts for each switch type and investment bucket.

3.13.2 Default Values

Switch Type:	Processor	MDF & Protector	Line Port	Line CCS	Trunk CCS	SS7
5EH	0.9322	0.6171	0.9301	0.9561	0.9715	0.9931
5ER	0.7959	0.6171	0.9483	0.9630	0.9935	NA
DMSH	0.9769	0.6171	0.9905	0.9685	0.9806	0.9782
DMSR	0.9254	0.6171	0.9980	0.9791	NA	NA

3.13.3 Source

The adjustment factors are the result of an analysis performed by BellSouth upon the set of SCIS switch Model Offices that were used in the regression analysis. The discounted and undiscounted investments were compared to create an effective discount ratio per bucket.

3.13.4 Rationale

The effective switch discount for each investment bucket varies somewhat because the equipment prices used in the different categories include varying amounts of vendor labor, in addition to hardware. The vendor labor has a different effective discount from that of the hardware. These factors adjust the individual bucket discounts to account for that fact.

3.14 Engineering Option

This input specifies whether the switch total investment estimation will use the Engineered Busy Hour Calls and CCS per line (inputs 1.6 and 1.7) or the optional residence and business calling characteristics (inputs 1.8 through 1.15).

3.14.1 Valid Values

- "D" - The model will use engineered inputs to estimate the switch investment.
- "C" - The model will use optional inputs to estimate the switch investment.

3.15 USF Option

3.15.1 Definition

Specifies whether the model will use the Engineered Busy Hour Calls and CCS per line (inputs 1.6 and 1.7), or the optional residence and business calling characteristics (inputs 1.8 through 1.15), to compute the busy hour universal service investment per line.

3.15.2 Valid Values

- "D" - The model will use engineered inputs to estimate the universal service investment.
- "C" - The model will use optional inputs to estimate the universal service investment.

3.16 Small Switch Thresholds

3.16.1 Definition

The switch line size below which the small switch model is invoked.

3.16.2 Default Values

Standalone Threshold	Host Threshold	Remote Threshold
4000	3500	500

3.16.3 Source

The default values are based on the judgement of the BCPM model developers.

3.16.4 Rationale

The default values were selected to be consistent with the BCPM large switch regression model and small switch regression model. In general, the line sizes selected approximate a minimum efficient scale for the BCPM large switch (5ESS and DMS-100) model.

3.17 Investment Parameters for Small Switches

3.17.1 Definition

These are the fixed and per line investments to be used for small wire centers with sizes below the thresholds set under input 3.16 above. Switch equations for up to three switch models may be used.

3.17.2 Default Values

		Vendor 1	Vendor 2	Vendor 3
Standalone	Fixed Investment per Switch	$589,262.60	$ -	$-
	Investment per Line	$42.69	$-	$-
Host	Fixed Investment per Switch	$589,262.60	$-	$-
	Investment per Line	$42.69	$-	$-
Remote	Fixed Investment per Switch	$54,269.76	$-	$-
	Investment per Line	$144.58	$-	$-

3.17.3 Source

This Switch Curve used in this process was developed by Dr. David Gable of Queens College. It was presented to the FCC by Dr. Gable on August 20, 1997 in a study titled "Estimating the Costs of Switches and Cable Based on Publicly Available Data." The study was based on a regression analysis using data provided by the Rural Utility Service (RUS) for about 136 switches. A final version of this report, with slightly revised results, was recently published at "http://nrri.ohio-state.edu."

3.17.4 Rationale

The BCPM Sponsors believe that this switch investment function was based upon the most reliable readily available source of small switch data at the time the model was released.

3.18 Vendor Discounts for Small Switches

3.18.1 Definition

If the small switch cost functions entered in Input 3.17 represent vendor list prices, a company-specific discount may be entered here to reflect net prices.

3.18.2 Default Values

Vendor 1 Discount	Vendor 2 Discount	Vendor 3 Discount
0%	0%	0%

3.18.3 Source

These discount levels may be obtained from operating company procurement experts.

3.18.4 Rationale

No discounts are required for the default small switch curve because the data used for development of that curve represents net prices.

3.19 Small Switch Partitioning Percentages

3.19.1 Definition

These percentages are used to separate the total switch investments generated by the small switch equation into functional investment category (FCAT) investments.

3.19.2 Default Values

	Processor	Line Port	Line CCS	Trunk CCS	MDF/Prot	SS7
Standalone	30.9%	23.0%	33.0%	6.2%	4.6%	2.4%
Host	19.0%	27.6%	38.7%	7.9%	5.7%	1.1%
Remote	32.5%	27.8%	33.8%	0.0%	5.9%	0.0%

3.19.3 Source

Locally-developed engineering studies vendor invoices and contracts are the preferred source for this information. The default data was generated from a typical state run of the large switch model during BCPM model development.

3.19.4 Rationale

The BCPM Sponsors believe that the large switch partitioning percentages represent the best available surrogate for the small switches. Development of specific local input data, is recommended where possible.

4 Regression Coefficient Table

4.1.1 Description

The values in the Regression Coefficient Table are the result of a modeling process that is described below.

4.1.2 Default Values

Switch Type	Total Lines	Trunks	Calls	Line CCS	5EH/5ER	5E*Total Lines	5EH*Trunks	Constant
Example Data Units	5000	400	2.5	3.5	=1 if 5E, = 0 else	=total lines if 5E, =0 else	=trunks if 5EH, =0 else	
Stand Alone								
Total Inv	358.74	314.64	822,200	0	-220,880	-57.44	0	0
Port	157.96	0	0	0	0	-105.64	0	0
Line CCS	132.74	0	0	0	-162,030	45.47	0	0
Processor	18.46	0	419,110	0	-398,550	37.74	0	1,194,100
Trk CCS	0.00	522.64	0	0	0	0.00	-243.34	0
MDF	15.74	0	0	0	0	0.00	0	0
SS7 Share	--- residual ---							
Host								
Total Inv	341.87	481.45	1,062,100	0	-604,800	-71.64	0	0
Port	164.12	0	0	0	0	-114.89	0	0
Line CCS	129.36	0	0	0	122,110	38.40	0	0
Processor	5.98	0	486,620	0	-851,270	45.83	0	1,404,600
Trk CCS	0.00	562.24	0	0	0	0.00	-255.03	0
MDF	16.57	0	0	0	0	0.00	0	0
SS7 Share	--- residual ---							
Remote								
Total Inv	395.02	0	138,340	0	296,350	-118.60	0.00	0
Port	217.86	0	0	0	0	-154.85	0.00	0
Line CCS	136.43	0	0	0	134,090	25.60	0.00	0
Processor	25.53	0	124,620	0	154,810	14.97	0.00	0
MDF	22.04	0	0	0	34,490	-10.59	0.00	0

4.1.3 Source

This table was developed by INDETEC using data supplied by BellSouth, US WEST, and Sprint. Complete documentation of the switch curve development is included in the *BCPM 3.1 Model Methodology* document.

5 External Investment Table

This table allows for the input of total discounted switch investments from a variety of sources. The format was designed to fit the data items specified for the FCC Universal

Service Data Request of July 31, 1997. The investment number used should be the installed investment, including vendor installation and engineering and Telco installation and engineering.

6 SCIS Investment Table

This table allows for the mechanized input of non-discounted investments (by investment category) from SCIS runs. These investments can be used directly within the Model in lieu of the investments estimated by the Switch Regression Model.

7 SCM Investment Table

This table allows for the mechanized input of non-discounted investments (by investment category) from SCM runs. These investments can be used directly within the Model in lieu of the investments estimated by the Switch Regression Model.